

THE SANTA CRUZ FAUNA AND THE PRINCETON EXPEDITION TO PATAGONIA.¹

IT is with the greatest satisfaction that we welcome the first-named instalment of an important work. The Santa Cruz Tertiary mammalian fauna is one of the most interesting and remarkable in the world, and we have now, for the first time, a guarantee that it will be described in a manner worthy of its importance. Hitherto this wonderful fauna has been but very scantily represented in museums outside of the Argentine, and in consequence students could gain only a very imperfect idea of its extent and affinities owing to the majority of the descriptions being of a more or less preliminary nature and inadequately illustrated. The acquisition by the Princeton Museum of the very large series of specimens collected by the expeditions to Patagonia under the charge of Mr. J. B. Hatcher from 1896-1899, together with a careful survey of all the other known collections, has now rendered it possible to publish full and adequate descriptions of all the more important types, and through the liberality of Mr. J. Pierpont Morgan the work will not be cramped for lack of illustrations.

In the introductory chapter, Prof. Scott, whose name is a sufficient guarantee for the excellence of the work, states that it has been decided to describe the specimens with a degree of detail which would be unnecessary in the case of forms well represented in museums throughout the world, and this detail will render his treatment of the work practically exhaustive. Some idea of the magnitude of the task will be gathered when we state that the present fasciculus of 106 4to pages is devoted entirely to the armadillos.

From the general character of the Santa Cruz fauna Prof. Scott is of opinion that Miocene Patagonia was rather an outpost of the South American fauna than the main area of its development. So far as the Edentates are concerned, this statement is justified by the apparent absence from the Santa Cruz horizon of representatives of the true sloths and anteaters, which, judging from the comparatively slight differences between the Santa Cruz Edentates and their Pampean successors, must almost certainly have been in existence at the epoch in question. This view is strengthened by the circumstance that many of the modern types of armadillos are unrepresented by ancestral forms in the Santa Cruz formation.

In general the Santa Cruz armadillos may be said to have attained the modern degree of specialisation, although in many details primitive features are retained. None of them, for instance, have an anterior solid shield to the carapace, which consists in most cases entirely of movable bands, although in certain instances a pelvic shield is developed. The most aberrant type is the horned *Peltephilus*, which has a full series of front teeth. The reference to this genus of a humerus of a somewhat monotreme-like type is not supported by the Princeton collection. Following the lead of other American zoologists, Prof. Scott splits up the Edentata into a larger number of family and generic groups than has generally been the fashion in this country, the number of such divisions being, of course, largely a matter of individual opinion. Prof. Scott, it will be noticed, has no hesitation in regarding the Santa Cruz fauna as of Miocene rather than of Eocene age.

The collection and description of the fossil mammals

and birds, although the prime, was by no means the sole object of the expedition, and, according to a provisional scheme issued by the publication committee, it is intended to issue a full account of the zoology, palæontology, botany, and geology of the districts traversed. In this scheme it was proposed to complete the work in six volumes of about 500 pages each, and to do this within a period of four years. Apparently, however, this scheme proved inadequate, for in place of the botany forming a portion of vol. i., we find the sections before us constituting the first part of an eighth volume, the whole of the first being devoted to the narrative of the expedition and geography.

With regard to the botany, a very brief notice must suffice. The general characters of the vegetation of western Patagonia are described by Prof. Dusèn, who directs attention to the sharp demarcation between the evergreen and the deciduous beech-forests respectively characterising the two slopes of the Cordillera, and also between the whole forest tract and the Patagonian steppe. The Bryophyta are described by the same writer, but the Hepaticæ are treated by Mr. Evans and the Pteridophyta by Mr. Macloskie.

The bulky and beautifully illustrated volume devoted to the narrative of the expedition and geography teems with interest, but here, again, limitations of space prevent our doing justice to its contents. Perhaps the most generally interesting section is the one describing the Tehuelche Indians and their mode of life, which contains a number of most excellent portraits of these interesting tribes, as well as illustrations of the manner in which guanaco robes and other articles are manufactured. Judging from plate 1., the Tehuelche girls are far from uncomely, but, as shown in the preceding plate, there is a sad falling off in personal appearance with advancing age.

So far as it is yet advanced, the work is an excellent example of the thoroughness of modern American treatment of scientific subjects

R. L.

PROF. KARL ALFRED VON ZITTEL.

GEOLOGISTS and biologists throughout the world will lament the death of Prof. K. A. von Zittel, the accomplished palæontologist of Munich. For more than thirty years he had been acknowledged as the leading exponent of the science which is intimately connected with the progress both of geology and biology. For a still longer period his charming personality had combined with his wide reputation to attract to the Palæontological Museum at Munich students of the natural sciences from all civilised nations. Those who were unable to follow the prescribed university course were at least frequent guests, taking advantage of the unrivalled facilities for study and research among fossils which the professor's laboratories and collections afforded. So highly appreciated, indeed, was the school of palæontology in Munich that Prof. von Zittel soon began to experience the practical sympathy of several of his wealthy fellow-citizens, who had learned of his fame. In this manner he was provided with funds to equip expeditions and purchase collections of fossils beyond the means of most institutions of a similar character. The result was that the Palæontological Museum in the old Academy of Munich, already fine when von Zittel became professor, rose to preeminence among the museums of the European continent. It began to illustrate not only Bavaria and Europe, but every part of the world from which fossils were known; and as the collections were acquired, descriptions of all the important novelties were always quickly published, usually prepared by some student-graduate working under the professor's direction.

¹ "Mammalia of the Santa Cruz Beds—1. Edentata, Dasypoda." By W. B. Scott. Rep. Princeton Exped. to Patagonia v., pp. 1-106; plates i-xvi. "Botany," part 1. By P. Dusèn, A. W. Evans and G. Macloskie. *Ibid.*, viii., pp. 1-138, plates i-xi. "Narrative of the Expeditions and Geography of Southern Patagonia." By J. B. Hatcher. *Ibid.*, i., pp. 314. Illustrated.

Prof. von Zittel had the advantage of beginning his great life-work at the early age of twenty-seven. Born at Bahlingen, in Baden, on September 25, 1839, he completed his education in the Universities of Heidelberg, Paris, and Vienna, and in 1863 he became teacher of geology and mineralogy in the polytechnic at Carlsruhe. In 1866 he succeeded Oppel as professor of geology and palæontology in the University of Munich. At this time he was interested in questions of stratigraphical geology, which depended much on the accurate determination and comparison of fossils. He had already written two important memoirs on the bivalved shells from the Cretaceous Gosau formation, which had been published by the Vienna Academy. He was then beginning to study the so-called Tithonian formation, on which he issued an important memoir in 1870, determining that it was equivalent to the Purbeck and Wealden formations of western Europe. These and other researches of a similar nature gradually impressed upon von Zittel the necessity for a fundamental revision of the whole science of palæontology, as it was then understood, and the preparation of a comprehensive treatise on the subject which could be used as a work of reference. He accordingly planned his now famous "Handbuch der Palæontologie," which was begun in 1876 and completed in four volumes in 1893, and this was the systematic basis of nearly all his future research. He thoroughly studied the fossil representatives of each group of the animal kingdom in order from the Protozoa to the Mammalia, and his original observations were not only incorporated in the "Handbuch" itself, but also formed the subject of many special papers and memoirs. Quite at the beginning of his task he met with unusual difficulties in the classification of the sponges, which necessitated his abandoning the projected treatise until he had devoted three years to his classical "Studien über fossile Spongien," which were published by the Royal Bavarian Academy between 1877 and 1879. Almost simultaneously with the early work of Sollas in the same direction, von Zittel devised a means of studying the fossil sponges in thin sections under the microscope, and his novel researches eventually led to a systematic arrangement of the Porifera, which has been confirmed in all its essential features by subsequent investigations of both extinct and living forms. Some of his memoirs related even to the Vertebrata, and those on the Chelonia and Pterodactyls from the Lithographic Stone of Bavaria (*Palæontographica*, 1877, 1882) are especially valuable contributions to science.

On occasional excursions Prof. von Zittel still devoted himself to purely geological work, and among his published observations may be particularly mentioned those on the glaciation of the plain between Munich and the Alps, made in 1874 and 1875. Only in one instance, however, did he undertake researches of a geological nature on a large scale, namely, when he accompanied the Rohlfs Expedition to the Libyan Desert in 1873-74. The important results of these investigations were presented to the Royal Bavarian Academy as a "Festrede" on March 20, 1880, and a more detailed report (reprinted from the *Palæontographica*) was issued as a separate work in 1883 under the title "Beiträge zur Geologie und Palæontologie der Libyschen Wüste." In this volume von Zittel's geological treatise was supplemented by a series of detailed descriptions of the fossils by Fuchs, Mayer-Eymar, Schenk, and other palæontologists.

The *Palæontographica*, to which reference has been made, is a serial devoted solely to illustrated memoirs on fossils, founded by the eminent German palæontologists W. Dunker and Hermann von Meyer in 1846. From 1869 until his death Prof. von Zittel

was its responsible editor. The Munich school was thus provided with ample means for publishing palæontological researches, and the editor's former pupils have for many years been the principal contributors to its pages. Although Prof. von Zittel himself was the main factor in the production of many of these memoirs, he always regarded his share as merely that of a helpful teacher, and did not overshadow the plodding student by adding his own name as joint author.

For the purposes of elementary or less specialised teaching the professor published a large and valuable series of lecture-diagrams of palæontology ("Palæontologische Wandtafeln," 1879-91), and as soon as his great "Handbuch" was finished he began at once to prepare an up-to-date epitome of it in one volume, which appeared in 1895 as the "Grundzüge der Palæontologie." Von Zittel also sometimes attempted more popular writings, such as his little readable volume on rocks and fossils, named "Aus der Urzeit," which appeared in 1872, with a second edition in 1875. This work contained some interesting maps of the distribution of land and sea in Europe during the various Mesozoic and Tertiary periods. His last essay of general interest was an address on "Palæontology and the Biogenetic Law," read before the International Congress of Geologists in 1894 and published in English in *Natural Science*, May, 1895.

The address just mentioned was almost the only occasion on which Prof. von Zittel ventured to express any opinions on the philosophy of biology or the solution of fundamental problems. Apart from his brilliant researches on sponges, indeed, scarcely any of his work can be regarded as suggesting important novel points of view. His "Handbuch" contains innumerable new facts obtained by personal observation, and they are accompanied by many proposed changes in classification or nomenclature, but only a small proportion of these emendations have proved acceptable to those who have pursued later research. His comprehensive treatment of palæontology has stimulated the progress of the science and has been of immense value, not because it suggests problems, but because it is a monument of judicious industry and thoroughness in the collection and presentation of the known facts. Von Zittel's "Handbuch" is indeed a trustworthy dictionary for reference rather than a guide to profitable lines of inquiry; and when the Americans, under the direction of Dr. C. R. Eastman, attempted a few years ago to infuse more philosophy into an English edition of the section Invertebrata of his "Grundzüge," Prof. von Zittel did not hesitate to express his dissent in conversation. A second edition of the first part of the "Grundzüge" has just appeared, in which none of the American palæontologists' changes are admitted. To understand the author's position it is only necessary to quote a sentence from his address of 1894:—"An important part is played to-day by subjective opinions, and when I think of the anxiety with which we elders—we who received our scientific education before the Darwinian era—proceeded to found a new species or genus, and compare it with the light-hearted manner in which to-day species, genera, families, and orders are set up and again put down, I am herein most forcibly impressed by the difference between then and now. The domination of the Linnæan and Cuvierian principles threatened systematic biology with soulless paralysis: the unbridled subjectivity of recent times may easily lead to anarchy."

A very striking instance of Prof. von Zittel's tireless industry in judicious compilation is his valuable "Geschichte der Geologie und Palæontologie bis dem Ende des 19ten Jahrhunderts," published by the Royal

Bavarian Academy in 1899. This volume was translated into English by the author's distinguished pupil, Mrs. Maria Ogilvie-Gordon, and issued in a slightly abbreviated form in Mr. Walter Scott's Contemporary Science Series in 1901. It will always remain a standard work of reference.

Prof. von Zittel naturally received numerous honours. Many years ago he became a Privy Councillor, and from 1899 until his death he was president of the Royal Bavarian Academy of Sciences. He was elected a foreign member of the Geological Society of London in 1889, and received the Wollaston medal in 1894. He was made a foreign associate of the United States National Academy of Sciences in 1898, and a correspondent of the Paris Academy of Sciences in 1900. His greatest joy was the ardent friendship with which he was honoured by his former pupils scattered through nearly all the civilised nations of the globe.

A. S. W.

NOTES.

THE fifth International Congress of Zoology, held at Berlin in 1901, selected Switzerland as the place of meeting for the sixth session, and elected Prof. T. Studer president. In accordance with this resolution, the congress will meet at Bern from August 14-19 of this year. Prof. Studer, Bern, is president of the general committee, and the vice-presidents are:—Prof. E. Beraneck, Neuchâtel; Prof. H. Blanc, Lausanne; Dr. V. Fatio, Geneva; Prof. L. Kathariner, Fribourg; Prof. A. Lang, Zürich; Prof. E. Yung, Geneva; Prof. F. Zschokke, Basel; and Prof. R. Blanchard, Paris. The secretaries are Prof. M. Bedot, Geneva; Dr. J. Carl, Geneva; and Dr. W. Volz, Bern. The general meetings will be held in the Palace of Parliament at Bern, and the sectional sittings in the new university. During the congress there will be an excursion to Neuchâtel and to the Jura lakes, in order to visit the lake-dwellers' settlements. The closing meeting of the congress will be held at Interlaken. Afterwards the members of the congress will be invited to visit other Swiss cities. Communications or inquiries referring to the congress should be addressed to the president of the Sixth International Congress of Zoology, Museum of Natural History, Waisenhausstrasse, Bern. The congress is open to all zoologists and to all who are interested in zoology.

THE *Atti* of the Lincei Academy announces the death, on November 25, of Angelo Maffucci, a member of the Academy since July, 1900.

A NEW Pasteur Institute has, says the *British Medical Journal*, been established at New Orleans, where the anti-rabic treatment will be carried out without any expense to the patients.

It is announced that Dr. Felix Kanitz died at Vienna on January 5. Dr. Kanitz, who was born at Budapest in 1829, was well known for his archæological and ethnographical labours in the Balkan peninsula.

It is reported that the Goodwin Sands lightships are to be put in communication with the shore by means of wireless telegraphy, and that the installation is to be completed in about a month. Four lightships will communicate with the Admiralty wireless telegraphy station near Shakespeare Cliff, Dover.

LIEUT. E. H. SHACKLETON, late third lieutenant of the *Discovery*, and one of the three men who reached furthest south in a journey from the ship, has been appointed secre-

tary of the Royal Scottish Geographical Society in succession to Lieut.-Colonel F. Bailey. Lieut. Shackleton had to be invalided home from the Antarctic on account of hæmorrhage of the lungs.

THE death is announced of Dr. F. von Hefner-Alteneck, a member of the Berlin Academy of Sciences and a well-known engineer. Dr. von Hefner-Alteneck was born at Aschaffenburg in 1845. After studying at Munich and Zurich he entered the firm of Siemens and Halske, with whom he remained until 1890. He became chief engineer of the firm, and was the inventor of many electric appliances produced by that house.

THE Geological Society of London has this year awarded its medals and funds as follows:—the Wollaston medal to Prof. Albert Heim, of Zurich; the Murchison medal to Prof. G. A. Lebour; the Lyell medal to Prof. A. G. Nathorst, of Stockholm; the Wollaston fund to Miss E. M. R. Wood; the Murchison fund to Dr. A. Hutchinson; the Lyell fund to Prof. S. H. Reynolds and Dr. C. A. Matley; the Barlow-Jameson fund to Mr. H. J. L. Beadnell.

BARON ERLAND NORDENSKJÖLD, who left Southampton on January 6 on an expedition to Bolivia, informed a representative of Reuter's Agency that the expedition would last at least eighteen months, as he intended to penetrate the northern forests of Bolivia for the purpose of studying the hostile Indian tribes along the various tributaries of the Amazon, and the region to be traversed was practically unknown. He is accompanied by Lieut. D. de Bildt, a son of the Swedish Minister in London, and Dr. Holmgren.

At a meeting on January 5, the Bath City Council had under consideration a letter from the National Trust relative to the quarrying in the Cheddar Cliffs, and unanimously adopted the following resolution:—"That this council has heard with sincere regret of the damage which is being caused to the Cheddar Cliffs by the quarrying of stone therefrom, and other works connected with such quarrying, and trusts that steps may promptly be taken for preserving in its original condition, so far as practicable, this most picturesque and interesting feature of the West of England." Similar resolutions have also been passed by the Somerset County Council and other public bodies in the district.

DR. NORDENSKJÖLD and the members of his South Polar Expedition arrived at Hamburg on January 6. The unexpectedly early return from the South Polar regions of this expedition has, the *Times* states, enabled Dr. Jean Charcot to recast the plans of the French expedition on board the *Français*. He now proposes to explore the west coast of Graham Land and to carry out a very exhaustive scientific investigation of that region. From Flanders Bay, at the south-west end of Belgica Strait, Dr. Charcot intends to push south in the direction of Pitt Island and Adelaide Island, with Alexander Land as the great goal of the expedition's efforts. With the return of the Antarctic spring, if winter quarters have been taken up far enough south, Alexander Land will be the objective of these parties; otherwise the excursions will be undertaken with the object of linking up the work of the French expedition with that which Dr. Nordenskjöld and his companions have accomplished, working from the other, or eastern, side of the land masses in this part of the Antarctic region. It is Dr. Charcot's definite intention to return at the end of the season of 1904-5. The *Français*, indeed, is only provisioned for two years, and Dr. Charcot states that if the expedition does not return in the early months of 1905, it must be concluded that they have been involuntarily detained, and a relief vessel must be dispatched to their assistance.